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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,436	11/10/2003	Jeffrey A. Cook	203-0040 (FGT 3D5)	4595
36865	7590	05/16/2006	EXAMINER	
ALLEMAN HALL MCCOY RUSSELL & TUTTLE, LLP			NGUYEN, TU MINH	
806 S.W. BROADWAY, SUITE 600			ART UNIT	
PORTLAND, OR 97205			PAPER NUMBER	

3748

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/705,436

Applicant(s)

COOK ET AL.

Examiner

Tu M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>111003</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claim 13 is objected to because on line 1 of the claim, --, wherein-- should be inserted following "claim 12". Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 7-14, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Hamburg et al. (U.S. Patent 5,282,360).

Re claims 1, 2, 9, and 10, as shown in Figures 4-6, Hamburg et al. disclose a method for controlling fuel injection into an engine (41) having an exhaust system with an emission control device (42) located therein, the method comprising:

- reading information from a downstream sensor (44) coupled in the emission control system downstream of the emission control device, the information including a substantially linear indication of exhaust air-fuel ratio across a range of air-fuel ratios from at least 12:1 to 18:1 (the downstream sensor (44) exhibits a sharp change at an air-fuel ratio at 14.7 and is

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mostly linear for an air-fuel ratio outside an area designated as “linear region” by Hamburg et al. (see Figure 1B));

- reading information from the sensor (44) identifying a stoichiometric point, the information based on a measurement signal obtained from the sensor differently than a measurement signal used to produce the substantially linear indication (as indicated in Figure 5B, a sensor signal of 0.8 which indicated rich of stoichiometry is obtained);

- adjusting a setpoint (switch point) for an upstream sensor (43) based on the signal (see lines 51-53 of column 4); and

- adjusting fuel injection into the engine based on the adjusted setpoint and a signal from the upstream sensor (see Figure 5C).

Re claims 3, in the method of Hamburg et al., the information from the downstream sensor (44) includes the substantially linear indication under a first set of conditions (rich or lean of stoichiometry), and includes the substantially non-linear indication of stoichiometry under a second set of conditions (engine air-fuel ratio of 14.7).

Re claim 4, in the method of Hamburg et al., the substantially non-linear indication is sampled from a signal providing the substantially linear indication at a preselected condition (engine air-fuel ratio of 14.7).

Re claim 12, as depicted in Figures 4-6, Hamburg et al. disclose a system comprising:

- a sensor (44) generating a first signal providing a substantially linear indication of exhaust air-fuel ratio during a first set of conditions (Ramp Lean) (see Figures 5B and 1B), and a second signal generating a substantially non-linear indication of exhaust air-fuel ratio during a second set of conditions (Linear Feedback) (see Figures 5B and 1B); and

- a computer storage medium (47) having instructions encoded therein for controlling fuel injection into an engine (41) having an exhaust system with an emission control device (42) located therein, the medium comprising:

- code for reading the first and second signal from the sensor (44);
- code for adjusting a setpoint (switch point), for a feedback controller for an sensor (43) coupled upstream of the emission control device, based on the first and second signals (see lines 51-53 of column 4); and
- code for adjusting fuel injection into the engine based on the adjusted setpoint and a signal from the upstream sensor (see Figure 5C).

Re claims 7 and 17, in the method and system of Hamburg et al., the code for adjusting fuel injection into the engine further includes code for adjusting fuel injection into the engine based on an error between the adjusted setpoint and a signal from the upstream sensor (lines 51-53 of column 4).

Re claims 8, 11, and 18, in the method and system of Hamburg et al., the adjusted setpoint is adjusted to be a stoichiometric value (lines 10-12 of column 5).

Re claim 13, in the system of Hamburg et al, first signal and second signal are provided via an electronic circuit (47) coupled to the sensor (44), and wherein the emission control device (42) is located upstream of the sensor (44).

Re claim 14, in the system of Hamburg et al., the second signal is sampled from the first signal during the second set of operating conditions (Linear Feedback).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5, 6 and 15, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamburg et al. as applied to claims 1 and 12, respectively, above, in view of Schumacher et al. (U.S. Patent 6,116,021).

Re claims 5 and 15, the method and system of Hamburg et al. disclose the invention as cited above, however, fail to disclose that the upstream sensor is a HEGO sensor.

As indicated on lines 31-38 of column 1, Schumacher et al. teach that it is conventional in the art to utilize Heated Exhaust Gas Oxygen (HEGO) sensors for several On-Board Diagnostic (OBD) systems to control an engine air-fuel ratio to reduce harmful emissions in the exhaust gas and to diagnose a working condition of a catalytic converter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have replaced the upstream sensor of Hamburg et al. with a HEGO sensor as taught by Schumacher et al., since the use thereof would have been routinely utilized by those with ordinary skill in the art.

Re claims 6 and 16, in the modified method and system of Hamburg et al., the upstream sensor is a UEGO sensor (see claim 7 of Schumacher et al.).

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6. Claims 1, 2, 6, 9, 10, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakuyama et al. (U.S. Patent 6,637,194) in view of Hamburg et al.

Re claims 1, 2, 9, 10, and 12, as depicted in Figures 1, 9, and 10, Kakuyama et al. disclose a system and a method for controlling fuel injection into an engine (1), the system comprising:

- a sensor (13) generating a first signal (VRO2) providing an indication of exhaust air-fuel ratio during a first set of conditions (step S52 with YES answer) (also see Figure 9B), and a second signal (VRO2) generating an indication of exhaust air-fuel ratio during a second set of conditions (steps S52 and S55 with NO answer (i.e., VRO2 is within a region bounded by curves C and D)); and

- a computer storage medium (2) having instructions encoded therein for controlling fuel injection into an engine (1) having an exhaust system with an emission control device (10) located therein, the medium comprising:

- code (step S51) for reading the first and second signal from the sensor (13);
 - code (step S53 or S56) for adjusting a setpoint (VFAP), for a feedback controller for an sensor (3) coupled upstream of the emission control device (10), based on the first and second signals; and
 - code for adjusting fuel injection into the engine based on the adjusted setpoint (VFAP) and a signal from the upstream sensor (see the Abstract).

In Kakuyama et al., the sensor (13) is an on-off type of oxygen sensor (lines 59-64 of column 6). They, however, fail to disclose that this type of sensor generates a first signal providing a substantially linear indication of exhaust air-fuel ratio from at least 12:1 to 18:1,

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and a second signal generating a substantially non-linear indication of exhaust air-fuel ratio at or about stoichiometry.

As shown in Figure 1B, Hamburg et al. teach that such on-off type oxygen sensor used as sensor (13) in Kakuyama et al. exhibits a first signal providing a substantially linear indication of exhaust air-fuel ratio from at least 12:1 to 18:1, and a second signal generating a substantially non-linear indication of exhaust air-fuel ratio at or about stoichiometry. Therefore, based on the teaching of Hamburg et al., it is obvious to one with ordinary skill in the art that the sensor (13) in Kakuyama et al. exhibits the characteristics as claimed.

Re claims 6 and 16, in the method and system of Kakuyama et al., the upstream sensor (3) is a UEGO sensor (lines 51-58 of column 6).

Prior Art

7. The IDS (PTO-1449) filed on November 10, 2003 has been considered. An initialized copy is attached hereto.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of four patents: Gopp (U.S. Patent 5,319,921), Bush et al. (U.S. Patent 5,842,340), Simon et al. (U.S. Patent 6,067,794), and Yasui (U.S. Patent 6,256,983) further disclose a state of the art.

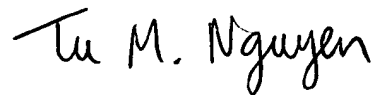
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Communication

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

Tu M. Nguyen

May 14, 2006

Primary Examiner

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